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# The Effect of Complementary Therapies on the Treatment of Chemotherapeutic Induced Nausea and Vomiting: A Systematic Review

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# The Effect of Complementary Therapies on the Treatment of Chemotherapeutic Induced Nausea and Vomiting: A Systematic Review

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## Abstract

Chemotherapy is one of the most prevalent treatment options for cancer patients, but a major side effect of this treatment, chemotherapeutic induced nausea and vomiting (CINV), can often be debilitating and problematic for patients. The goal of this systematic review is to evaluate the effectiveness of complementary therapies in reducing CINV in adult oncology patients. A total of 20 studies were reviewed of adult populations that received standard antiemetic care, with each study failing to yield the same results upon evaluating the effectiveness of complementary therapies on patients' CINV. The complementary therapies studied included ginger therapy, acupressure, acupuncture, guided imagery and music therapy. Evidence presented by the studies demonstrated a need for further investigation of such therapies due to the inconsistency of the results. When treating cancer patients who are experiencing CINV, complementary therapies should be considered as a plausible treatment option.

# The Effect of Complementary Therapies on the Treatment of Chemotherapeutic Induced Nausea and Vomiting: A Systematic Review

Cancer is described as abnormal cell growth that leads to the invasion and destruction of healthy tissue by those same cells (Tischauser, Ness, & Jones, 2016). The most recent reports from 2013 state that cancer affects at an age-adjusted incidence rate of 439 cases per 100,000 persons (Henley et al., 2017). Cancer treatments include surgery, radiation, chemotherapy, or a combination of all three (Tischauser et al., 2016). Chemotherapy involves administering medications that have a toxic effect on cancer cells to slow their growth, shrink tumors prior to surgery or radiation, or cure a specific cancer. Its frequency and duration depends on the specific type of cancer being treated, the stage it is in, and how well the person tolerates the medication (Costello, 2016). Chemotherapy has many side effects including fatigue, lack of appetite, decreased blood cell counts leading to anemia and risk for infection, reduced platelets leading to easy bruising and bleeding, fluid retention, diarrhea, nausea, and vomiting (Costello, 2016). Nausea and vomiting have been identified as the most prevalent, problematic, and distressing side effects (Middleton & Lennan, 2011). As healthcare professionals, nurses often witness the debilitating side effects of chemotherapy and therefore have to implement interventions to ease these effects.

When patients are dealing with chemotherapeutic-induced nausea and vomiting, they may experience it in one of the following phases: anticipatory, acute, delayed, breakthrough, and refractory (Middleton & Lennan, 2011; Becze, 2009). During the anticipatory phase, patients' nausea and vomiting occur prior to chemotherapy administration. The acute phase occurs within 24 hours of therapy; the delayed phase is experienced for six to seven days post-therapy; the breakthrough phase occurs despite prophylactic treatment; and the refractory phase is

experienced despite prophylactic treatment and breakthrough medication (Middleton & Lennan, 2011; Becze, 2009).

People who are younger and have a history of low alcohol consumption are at a higher risk of chemotherapeutic-induced nausea and vomiting. Women are also at greater risk, particularly those with a history of morning sickness during pregnancy. Also, those prone to motion sickness, and those who have previous experience with chemotherapy all are at higher risk for CINV (Hawkins & Grunberg, 2009). Uncontrolled CINV can lead to instances of poor nutrition; dehydration; electrolyte disturbances; and physical and psychological deterioration (Hawkins & Grunberg, 2009). In the longer term, CINV significantly affects treatment effectiveness, treatment adherence, and quality of life (Middleton & Lennan, 2011).

With the challenges of chemotherapeutic-induced nausea and vomiting being cited as the most concerning side effect by patients and experienced to some degree by approximately 70%-80% of patients receiving chemotherapy, it is very important to have measures to treat it (Becze, 2009). Advances in the treatment of chemotherapeutic-induced nausea and vomiting (CINV) have been recognized worldwide, ranging from typical pharmacologic antiemetics to complementary therapies (Middleton & Lennan, 2011). Traditional antiemetic pharmaceutical agents with the highest therapeutic index are 5-HT3 serotonin receptor antagonists, corticosteroids, and neurokinin 1 (NK1) receptor antagonists (Becze, 2009). In order to understand the approach for the treatment of CINV, it is important to understand the underlying physiology of the emetic response. The response can be stimulated by four different areas in the body: the chemoreceptor trigger zone (CTZ), the vestibular system, the brain cortex, and the gastrointestinal tract (GIT) (Middleton & Lennan, 2011). These four different anatomical areas send stimuli to the medulla of the brain, where the emetic response is controlled (Middleton &

Lennan, 2011). Important neurotransmitters, such as serotonin, acetylcholine, histamine, and substance P (plays a role in the activation of the vomiting reflex and binds to NK1 receptors), stimulate the GIT via the vagal nerve (Middleton & Lennan, 2011). The CTZ is responsible for detecting chemicals and toxins in the blood and is located at the fourth ventricle (Middleton & Lennan, 2011). The vestibular system and cerebral cortex are less involved but play a role due to the vestibular system sensing motion and position of the body (therefore, linked to motion sickness), and the brain cortex being responsible for sight, smell, taste, and memory (Middleton & Lennan, 2011). Examples of some of the pharmaceutical agents include dolasetron, granisetron, ondansetron, palonosetron, and tropisetron, as the 5-HT3 serotonin receptor antagonists; dexamethasone, as the corticosteroid; and aprepitant, as the NK1 receptor antagonists (Middleton & Lennan, 2011).

Although pharmaceutical interventions are an integral part to treating CINV, they are not always effective as it has been seen that the incidence of vomiting has been reduced but the incidence of nausea has risen related to the drugs' unknown mechanism of action (Middleton & Lennan, 2011).

The National Comprehensive Cancer Network and the American Cancer Society suggests patients who report pain scores of 4 or higher on a ten-point scale after analgesic treatment should then add non-pharmacologic measures to their plan of care (Running & Seright, 2012). Some common, non-pharmacologic, complementary therapies that have been found useful in treating CINV include aromatherapy, acupressure, acupuncture, guided imagery, and music therapy. Aromatherapy is the use of fragrant substances called essential oils which are distilled from plants to alter mood or improve symptoms such as stress or nausea. Acupressure is a non-invasive use of direct pressure by hands or wristbands to relieve tension in the body.

Acupuncture is the use of very thin needles being placed into the body to relieve a variety of symptoms, including mild pain and nausea. Guided imagery is a behavioral technique that uses one's imagination to achieve a therapeutic objective. Music therapy is when trained healthcare professionals use music to promote healing and enhance quality of life (Molassiotis, Helin, Dabbour, & Hummerston, 2013; Karagozoglu, Tekyasar, & Yilmaz, 2012; Running & Seright, 2012). The purpose of this systematic review is to describe and critically appraise the evidence of complementary therapy outcomes for CINV in adults receiving chemotherapy for cancer treatment. Recommendations for practice and research will be advanced based on the appraisal. The review will answer the PICOT question: *In adult oncology patients, what complementary therapies are effective in treating chemotherapeutic-induced nausea and vomiting to promote patient outcomes of decreased nausea and vomiting?*

## Methods

When deciding on the complementary therapies to focus on, more commonly used therapies were chosen, as found in the literature. These included the following: ginger, music therapy, guided imagery/hypnosis, acupressure, and acupuncture. Primary sources of research were identified and retrieved from PubMed, Cumulative Index to Nursing and Allied Health Literature (CINHAL Plus with Full Text), and UK PubMed Central using the following keywords: chemotherapeutic-induced nausea and vomiting; ginger; music therapy; guided imagery; hypnotherapy; hypnosis; acupressure; acupuncture; nausea; vomiting; and cancer. Inclusion criteria were research publications from within the past 10 years (2007-2017), peer-reviewed journals, primary sources, multiple arm studies, and adults (see Appendix A). If the research publications were older than ten years, we reviewed them to determine if findings were consistent with more recent studies. The study conducted by Melchart and colleagues was

included in this review because of the fact that it implemented a sham arm that resulted in a placebo effect (2006). The study by Sontakke, Thawani, & Naik was included because it was a double-blind and ginger was compared to two other antiemetics (2003). The research by Manusirivithaya et al. was included because it demonstrated the effects of ginger in both the acute and delayed phases of CINV (2004). The study by Chaiyakunapruk, Kitikannakorn, Nathisuwan, Leeprakobboon, & Leelasettagool (2006) was included because it provided data about ginger's effect on postoperative nausea and vomiting, giving a comparison to CINV. Exclusion criteria included: pediatrics, systematic reviews, interviews, single arm studies, biased articles, and articles whose main topic was not one of our designated categories. Sample size and design of the research studies were evaluated for their strengths and weaknesses. When analyzing the studies, consistent and inconsistent outcomes were included to decrease bias of review.

## Review of Literature

### Ginger

Ginger, a rhizome of *Zingiber officinale*, which was originally cultivated in Asia, has widely been used for years as an antiemetic (Sontakke, Thawani, & Naik, 2003). In Middle Eastern, Chinese, Indian, and western herbal medicine, ginger is mainly used for remedy for digestive disorders including dyspepsia, nausea, vomiting, and diarrhea (Zick et al., 2009). In a different population regarding the effects of ginger on postoperative nausea and vomiting (PONV), Chaiyakunapruk et al. (2006) found a 1gram dose to be effective in reducing PONV in a trial of 363 participants. A gap in knowledge of ginger's effects on CINV has warranted further investigation.

When researchers have studied the effect of ginger on chemotherapeutic-induced nausea

and vomiting (CINV), they have reported inconsistent findings. All eight studies included in the review of ginger were randomized controlled trials (RCT) of level 2 evidence, with four of them utilizing a crossover design (Lua, Salihah, Mazlan, 2015; Panahi et al., 2012; Ryan et al., 2012; Fahimi et al., 2011; Pillai, Sharma, Gupta, Bakhshi, 2011; Zick et al., 2009; Manusirivithaya et al., 2004; Sontakke et al., 2003) Of the four crossover studies, two used current anti-CINV treatment as the control group in place of a traditional placebo (Manusirivithaya et al., 2004; Sontakke et al., 2003). Six of the eight studies used small sample sizes ranging from 36 to 78 participants, with the other two studies utilizing large sample sizes ranging from 129 to 576 participants (Ryan et al., 2012; Zick et al., 2009). All examined the effects of ginger on acute and delayed nausea and vomiting, except Ryan et al. (2012) focused only on the acute stage of only nausea, and Sontakke at al. (2003) focused only on the acute stage of nausea and vomiting.

Of the studies researched, some found that ginger was effective in reducing the prevalence or severity of nausea, vomiting, or both in either acute, delayed, or both stages (Lua et al., 2015; Panahi et al., 2012; Ryan et al., 2012; Pillai et al., 2011; Manusirivithaya et al., 2004; Sontakke et al., 2003). The samples in these studies were undergoing moderate to highly emetogenic chemotherapies, such as cyclophosphamide, cisplatin, and doxorubicin (Lua et al., 2015; Panahi et al., 2012; PIllai et al., 2011; Manusirivithaya et al., 2004; Sontakke et al., 2003). Along with ginger, the samples were administered standard antiemetics, such as a serotonin antagonist, 5-HT3, throughout their chemotherapy cycle, metoclopramide, or ondansetron in the first day of chemotherapy, then a corticosteroid, usually dexamethasone, as needed (Lua et al., 2015; Panahi et al., 2012; Pillai et al., 2011; Manusirivithaya et al., 2004; Sontakke et al., 2003).

All researchers that found ginger to be effective studied the effect of ginger using control groups or comparing ginger with other antiemetic drugs (Ryan et al., 2012; Pillai et al., 2011;

Manusirivithaya et al., 2004; Sontakke et al., 2003). Pillai et al. (2011) and Ryan et al. (2012) tested ginger against other dosages of ginger or a group that received a standard placebo. Pillai et al. (2011) concluded that ginger was effective in reducing CINV in the acute and delayed stage, but not eliminating it. Ryan et al. (2012) concluded that ginger at a dose of 0.5g to 1g significantly reduced acute chemotherapeutic-induced nausea (CIN) when used alongside standard antiemetics. Manusirivithaya et al. (2004) and Sontakke et al. (2003) both studied the effectiveness of ginger in comparison to standard antiemetics on CINV. Manusirivithaya et al. (2004) found that ginger had no benefit in the acute stage, but demonstrated control in the delayed stage of CINV, but was no different in effectiveness than metoclopramide. Sontakke et al. (2003) concluded that ginger was effective in reducing CINV equal to that of metoclopramide but ondansetron was superior in its effectiveness.

Fahimi et al. (2011) and Zick et al. (2009) came to the conclusion that there was not enough information for ginger to be effective in reducing CINV. Fahimi et al. (2011) compared 1g of ginger a day to a placebo in their effectiveness on CINV. The sample received standard antiemetic treatment in addition to either the four capsules (250mg each) a day of ginger or four capsules of placebo and concluded that 1g a day for three days did not illustrate any impact on the sample's CINV (Fahimi et al., 2011). Zick et al. (2009) administered a low dose (1g) of ginger, high dose (2g), or a placebo to their sample and concluded that not only did ginger have no benefit on CINV alongside standard antiemetic treatment, but might have a negative interaction with it, such as the antiemetic aprepitant.

Although there is evidence supporting the effectiveness of ginger in treating CINV or CIN, there is still evidence that refutes or raises the need for further investigation. A common theme among all the studies was the need for further studies to be conducted with larger samples.

Zick et al. (2009) even commented on the need to blind the sample more due to the taste of ginger being recognized on the capsules. Overall, these findings raise questions on whether or not ginger is an evidenced based practice.

**Acupressure and Acupuncture**

According to traditional Eastern and Chinese medicine, illness occurs when there is an imbalance in energy, also known as Qi, in the body (Dibble et al., 2007; Molassiotis, 2007). The goal of such medicines is to restore the balance of Qi and to regain harmony throughout the body (Dibble et al., 2007). This can be achieved through acupressure or acupuncture (Molassiotis et al., 2007), which is superficial pressure that is applied to the skin that can be administered in various ways including the use of bands, thumbs, fingers, and hands (Dibble et al., 2007; Molassiotis et al., 2007). Pericardium 6 (P6) is the most commonly used pressure point used for nausea and vomiting (Melchart et al., 2006; Molassiotis et al., 2007). This point is located on the anterior side of the forearm, three fingerbreadths above the wrist (Molassiotis et al., 2007; Melchart et al., 2006) between the tendons of the palmaris longus and flexor carpi radialis (Molassiotis et al., 2007). In the postoperative population, acupressure and acupuncture have been effective on the treatment of PONV (Melchart, Ihbe-Heffinger, Lps, Schilling, & Lind, 2006). A gap in knowledge of acupressure and acupuncture as a complementary treatment for CINV has warranted further research to be conducted.

Of the six studies reviewed concerning acupressure and acupuncture, all were randomized control trials of level two evidence (Dibble et al., 2007; Molassiotis et al., 2007; Melchart et al., 2006). The sample sizes range from relatively small consisting of 28 and 36 participants (Molassiotis et al., 2007; Melchart et al., 2006) to large consisting of 68, 70,160, and 361 participants (Widgren & enblom, 2017; Rithirangsriroj et al., 2015; Molassiotis et al., 2014;

Dibble et al., 2007) .

Researchers have studied the effect of P6 on CINV and reported inconsistent findings. The samples in these studies were receiving moderate to highly emetogenic chemotherapy, such as Doxorubicin, Cyclophosphamide, Anthracycline (Dibble et al., 2007; Molassiotis et al., 2007). Along with acupressure and acupuncture, they were also prescribed traditional antiemetics, such as a serotonin antagonist, 5-HT3, for the day of treatment and a glucocorticosteroid, typically Dexamethasone, as needed (Dibble et al., 2007; Molassiotis et al., 2007; Melchart et al., 2006).

Several researchers provided evidence supporting the use of acupuncture and acupressure as an adjuvant to pharmacological methods when treating CINV (Rithirangsriroj, Manchana, & Akkayagorn, 2015; Dibble et al., 2007; Molassiotis et al., 2007; Melchart et al., 2006). When Dibble and colleagues (2007) as well as Molassiotis and colleagues (2007) studied the effect of Seabands, a brand of acupressure wristbands, on CINV, they found a decrease in the amount of delayed nausea (between days 2-5 post cancer treatment). The bands were to be worn continuously for 5 days following the cancer treatment only to be taken off when they would be submerged in water (Dibble et al., 2007; Molassiotis et al., 2007).

The use of a placebo, or sham, arm was used by Dibble et al. (2007), and Melchart et al. (2006). The sham acupressure point was S13 which is located on the ulnar side of the wrist (Dibble et al., 2007). Melchart et al. (2006) explored the effects of acupuncture in conjunction with acupressure and found that there was not a significant difference in the effectiveness of the experimental group and the sham group. The placebo in this study was inserting the needle at an alternative location in the wrist. The needle was not inserted to the same depth as that of the P6 location. Additionally it was not manipulated once the depth as achieved as it was at P6. Acupuncture took place 20 minutes prior to the administration of chemotherapy and was

followed by application of the Seabands for a constant 72 hours. The thought process was that acupressure helps extend the effectiveness of the acupuncture. This study resulted that there was no difference between the administration of the P6 point and the sham point, however, patients stated that they would like this therapy but they did not have a preference as to which point they received the therapy at (Melchart et al., 2006).

Rithirangsriroj and colleagues (2015) studied the use of acupuncture as well. In this study, however, acupuncture was used as the sole treatment for CINV as opposed to an adjuvant therapy with standard antiemetics prior to the administration of chemotherapy. It was found that there was a significantly higher response rate for those in the acupuncture group than the antiemetic group when it came to evaluating the prevention of delayed CINV. Delayed nausea control was higher in the acupuncture group while delayed emesis control was comparable in both groups (Rithirangsriroj et al., 2015).

While there is evidence supporting the use of acupuncture and acupressure to combat CINV, there is also research that did not reach statistical significance. This research includes that conducted by Widgren and Enblom (2017) as well as Molassiotis et al., (2014). Widgren and Enblom studied the effects of acupuncture on CINV. They implemented a three arm study that consisted of a standard antiemetic group which provided the use of pharmacological methods only, a sham group which consisted of non-penetrating needles at a non-acupuncture site, and a verum group which consisted of acupuncture at the P6 location. While no concrete inferences can be made from this study because of its lack of statistical significance, it is noteworthy that less rescue antiemetics were required for those in the verum group compared to those in the sham group after the 30 minute administration. The small sample size of 68 female participants led to the lack of statistical power (Widgren & Enblom, 2017).

Additionally, in a study conducted in 2014 by Molassiotis and colleagues containing 361 participants, there was no significant statistical difference in the effectiveness of Seabands when compared to the sham and standard care groups in the treatment of CINV. The acupressure group consisted of wearing Seabands with the plastic button on the anterior of the band at the P6 location while the sham group was to wear the bands with the plastic button on the exterior of to avoid pressing on the acupressure location. The bands in both groups were to be worn the morning before chemotherapy and then for 6 days after with the exception of bathing and showering. Participants were asked to use the Rhodes Nausea and Vomiting Index to score their experiences for the seven days. It was found that participants in the sham and acupressure groups experienced less severe nausea than compared to those in the standard care group although this did not reach statistical significance (Mollasiotis et al., 2014).

Melchart et al. (2006) found that while there were low scores of nausea and vomiting in the experimental group, there were also low scores in the sham group. Patients stated that they would recommend acupuncture and acupressure to others undergoing chemotherapy, however they were not specific in stating which point that they would recommend. These findings raise questions concerning placebo effects and if it would still remain appropriate to administer acupressure or acupuncture if there is no evidence to support it. Findings also support the need for future research about effectiveness of acupressure and acupuncture in the treatment of CINV.

**Music Therapy and Guided Imagery**

Music therapy is a therapy that has a multi-dimensional effect on human beings and is used in the treatment of CINV (Karagozoglu et al., 2012). When music therapy is integrated into treatment, it can affect one spiritually as well as physiologically (Karagozoglu et al., 2012). It

stimulates the autonomic nervous system and causes the brain to release endorphins, which have a similar effect on the body to that of morphine (Karagozoglu et al., 2012). Guided imagery is another therapeutic technique that has been studied in people with CINV. This technique utilizes the behavior of an individual and alters it to have a positive outlook on treatment and to reduce feelings of anxiety that can cause nausea and vomiting (Karagozoglu et al., 2012). Gimeno (2010) stated that in other studies, both music therapy and guided imagery was successful in stress reduction and pain relief. This demonstrates a gap in knowledge of these therapies and their effect on CINV.

A total of five studies were reviewed about the effectiveness of music therapy and guided imagery on the treatment CINV (Hosseini, Tirjari, Forouzi, & Jahani, 2016; Karagozoglu et al., 2012; Gimeno, 2010; Zachariae et al., 2007; Marchioro et al., 2000). Two of these studies were qualitative experimental studies with sample groups consisting of 40 eligible cancer patients (Karagozoglu et al., 2012) and 55 eligible breast cancer patients (Hosseini et al., 2016). Karagozoglu et al. (2012) and Hosseini et al. (2016) collected data pre and post intervention of guided imagery and music therapy during chemotherapy treatment. Both used the Morrow Assessment of Nausea and Vomiting before and after the intervention to measure the effect of guided imagery (Hosseini et al., 2016; Karagozoglu et al., 2012). Both studies concluded that guided imagery and music therapy are practical, inexpensive, and noninvasive therapies that effectively reduce and control CINV (Hosseini et al., 2016; Karagozoglu et al., 2012). With sufficient training, these techniques can successfully manage patients' CINV and should be utilized on chemotherapy units in the clinical setting (Hosseini et al., 2016; Karagozoglu et al., 2012). Gimeno (2012) studied 20 adult cancer patients receiving chemotherapy and examined the effects of guided imagery and music therapy on CINV. A

quantitative descriptive study was used to evaluate the effectiveness of guided imagery and music therapy in reducing CINV in patients (Gimeno, 2010). Regression analysis was used to evaluate the frequency of CINV amongst test subjects as well as heart rate (Gimeno, 2010). Results showed a significant decrease in the frequency of CINV after the implementation of both guided imagery and music therapy (Gimeno, 2010). Based on these findings, guided imagery and music therapy appear to be effective complementary alternative therapies to treat CINV (Hosseini et al., 2016; Karagozoglu et al., 2012; Gimeno, 2010).

Researchers have also studied how guided imagery and music therapy techniques involving the psychology and behavior affected both anticipatory nausea and vomiting related to chemotherapy and post-CINV (Zachariae et al., 2007; Marchioro et al., 2000). Zachariae et al. (2007) evaluated 125 women receiving adjuvant chemotherapy for breast cancer pre and post intervention. They utilized a variety of scales to measure sensory perception and autonomic reactivity of music therapy and guided imagery and its effect on anticipatory CINV (Zachariae et al., 2007). This study was different in the fact that Zachariae et al. (2007) focused on the general concept of sensory perception and autonomic reactivity related to anxiety, nausea and vomiting from chemotherapy treatment, not necessarily coming from music therapy and guided imagery. However, sensory perception and autonomic reactivity can come from music therapy and guided imagery, so the study is considered useful and informative. This study concluded that the association of sensory perception and autonomic reactivity (from music therapy and guided imagery) is strongest in the early stages of chemotherapy treatment (Zachariae et al., 2007). The implementation of music therapy and guided imagery techniques would be considered more effective in treating CINV in the beginning stages of chemotherapy treatment and can greatly reduce anticipatory anxiety, nausea and vomiting related to chemo treatment

(Zachariae et al., 2007). Marchioro et al. (2000) studied 16 adult cancer patients receiving chemotherapy and examined the effects of guided imagery on anticipatory nausea and vomiting related to chemotherapy. The guided imagery technique of hypnosis was implemented to induce relaxation and to reduce anticipatory nausea and vomiting (Marchioro et al., 2000). Hypnosis focuses on the psychological factors related to guided imagery, and it alters a person's state of mind rather than just their visions (Marchioro et al., 2000). After the implementation of hypnosis, anticipatory nausea and vomiting related to chemo treatment disappeared in all subjects and CINV post treatment was reduced in almost all subjects (Marchioro et al., 2000). Zachariae et al. (2007) and Marchioro et al. (2000) revealed that the implementation of guided imagery techniques involving the psychology and behavior of a patient are effective in reducing anticipatory nausea and vomiting and CINV (Zachariae et al., 2007; Marchioro et al., 2000).

Researchers have consistently found that music therapy and guided imagery effectively reduce and manage CINV (Hosseini et al., 2016; Karagozoglu et al., 2012; Gimeno, 2010; Zachariae et al., 2007; Marchioro et al., 2000). Additional research could further support the use of guided imagery and music therapy to reduce CINV, and this should be completed to increase the validity of research findings. Small sample sizes and inconsistent data collection techniques amongst the trials make it difficult to draw secure conclusions about the effects of guided imagery and music therapy on the treatment of CINV (Hosseini et al., 2016; Karagozoglu et al., 2012; Gimeno, 2010; Zachariae et al., 2007; Marchioro et al., 2000).

## Critical Appraisal of the Evidence

### Ginger

Limitations to consider regarding the studies done on ginger are the lack of blindness, the

potent aroma and taste of ginger, lack of control with severity of nausea and vomiting prior to administration, and the lack of control for various chemotherapies with high versus low emetogenic regimens.

Lack of blindness and potent aroma and taste of ginger went hand in hand as it is hard to blind a subject appropriately with the scent and taste of ginger being very recognizable. Those subjects would know whether or not they received the placebo or not, leading to the placebo effect.

Lack of control with the severity of nausea and vomiting prior to ginger administration can affect the data collected and making the results not as significant if prior level of nausea and vomiting is unknown, therefore the outcome is unmeasurable.

Lack of control with which chemotherapy the subject is receiving can affect the outcomes measured with how well the ginger will work. If the subject is being treated with a highly emetogenic compared to a lower type, it can lead to an incorrect measurement of efficacy.

**Acupressure and Acupuncture**

One limitation to consider in several of these studies is the small population size or the fact that the studies did not reach statistical significance.

Another limitation is the predominantly female population observed in the research regarding breast cancer or gynecological cancer and acupressure and acupuncture. There is not enough current research to determine if male subjects would experience the same effects.

Additionally, some of the studies reviewed took place more than 5 years ago. This lends itself to lose some credibility in terms of relevance. These studies would need to be replicated in order to ensure accuracy.  While the use of a placebo group strengthens a study, there were several studies that did not utilize a placebo group due to various reasons including funding and

feasibility. This poses a limitation to the research that was reviewed.

There is also the consideration of the administration of the therapy. In the event of acupressure, Dibble et al. (2007) required subjects to apply pressure to specified location with the opposite thumb for three minutes whenever there was an onset of nausea while Molassiotis et al. (2007) had subjects wear Seabands continually for 5 days excluding time in the shower or bath with an additional 2-3 minutes of added pressure to the P6 point every 2 hours. Because of the varied methods of administration, this is not consistent in considering if acupressure overall is effective in reducing CINV because of the fact that different forms of acupressure were utilized in the various studies.

Ethical considerations can also be considered a limitation in this type of research. For example, limiting the amount of rescue antiemetics a patient is allowed to take is prohibited. Because of this, there is no way to regulate the amount of antiemetics and how effective the complementary therapies truly are.

**Guided Imagery and Music Therapy**

Limitations to consider when evaluating the studies on guided imagery and music therapy as complementary therapies for CINV include sample group inaccuracies, limited control for the severity of chemotherapy used for each patient, and lack of continuity between the studies and their methods.

One inaccuracy of the samples would be the use of breast cancer patients only in two of the studies (Hosseini et al., 2016; Zachariae et al., 2007), which excludes male cancer patients when evaluating the effectiveness of these treatment therapies. It would be more conclusive to include studies with populations of both males and females. Another sample group inaccuracy would be the small sample sizes used in many of the studies, with one study having as little as

sixteen patients.

It is also important to consider the limited control of the study in regards to the patients and their conditions. Patients' specific cancers and severity can vastly differ, and as a result their treatment regimens will also differ, with some being more aggressive than others. Patients receiving more aggressive chemotherapy might have more severe CINV, and guided imagery and music therapies might not be as effective in reducing their CINV. The patients' cancer and disease progression cannot be controlled, and neither can their response to more aggressive chemotherapy, in this case CINV.

The lack of continuity is another limitation to consider. This lack of continuity was present between the scales the studies used to evaluate severity of patients' nausea and vomiting. For example, Karagozoglu et al. (2012) and Hosseini et al. (2016) performed studies that utilized the Morrow Assessment of Nausea and Vomiting to evaluate the severity of CINV before and after guided imagery and music therapies were implemented. Although this assessment tool was able to show that guided imagery and music therapy were effective methods to decrease CINV, the other studies did not use this same assessment. Therefore, it cannot be assumed that this assessment is the most reliable way to evaluate effectiveness of these therapies reducing CINV.

These various limitations and inaccuracies involved with the studies regarding guided imagery and music therapy as complementary therapies to reduce CINV decrease both the reliability and validity of the findings. The findings from these studies are unable to provide external validity because the results cannot be generalized to all oncology patients experiencing CINV.

## Synthesis of the Evidence

Research states that nausea and vomiting as a result of chemotherapy has an impact on

the quality of life that one experiences. While research is divided with regard to whether or not the above-mentioned therapies are effective in reducing CINV, there has been research to show that it is beneficial to some individuals. The use of ginger, acupressure/acupuncture, guided imagery, and music therapy are all cost effective and cause minimal, if any, side effects. Therefore, the exploration of nontraditional pharmacologic, complementary therapies should be explored for patients who are affected by CINV. Because of the limited side effects of these therapies, it can be suggested that these be implemented in the event that the nausea and vomiting is not controlled by standard treatment alone, or in the event that the patient wishes to explore holistic, nonpharmacologic methods. Of course, any type of treatment should be discussed with a physician prior to initiation.

## Recommendations

For future research, initiation of placebo trials is recommended. The use of placebo groups will limit the emotional and anticipation of the complementary therapies' effectiveness.

For the use of ginger, future research should include a control of a patient's level of nausea and vomiting before administration of ginger. Studies should incorporate an effective way to conceal the smell or taste of ginger to prevent the placebo effect from occurring. Lastly, studies should compensate for the various chemotherapy regimens that can have a higher or lower emetogenic effect, which could potentially be as easy as dividing patients into groups regarding their type of chemotherapy, then testing ginger's efficacy on each type.

For the use of acupressure and acupuncture, future research should include male populations due to the fact that several of the studies reviewed had a homogenous female population. It should be researched of the correlation between gender and the effectiveness of the complementary therapies. Additionally, the studies conducted by Dibble et al. (2007) and

Molassiotis et al. (2007) were able to show a correlation between age and the effectiveness of acupressure in the event of CINV. Research should formally be conducted with the relation of age and how acupressure effects CINV as its main focus.

For the use of guided imagery and music therapy, future research should include greater sample sizes with both genders equally represented as closely as possible. Many of the studies reviewed were specific to only female cancer patients, as they were focused on breast cancer patients and their response to CINV therapies. Another consideration for further research and studies would be to include the severity of patients' cancer and treatment and how this might affect their response to guided imagery and music therapy as treatment for CINV. Further research would help to strengthen evidence and validate the use of guided imagery and music therapy as treatment therapies for CINV.

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# Appendix A

**Systematic Review Table of Evidence**

| **APA formatted reference** | **Purpose Statement, Research Question** | **Clinical Practice Setting, Sampling, Methods, Sample Size** | **Design, Level of Evidence** | **Findings, Conclusion** | **Practice & Research Implications** | **Limitations of Findings** |
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| 1.Chaiyakunapruk, N., Kitikannakorn, N., Nathisuwan, S., Leeprakobboon, K., & Leelasettagool, C. (2006). The efficacy of ginger for the prevention of postoperative nausea and vomiting: a meta-analysis. American Journal Of Obstetrics And Gynecology, 194(1), 95-99. | to specifically determine the impact of a fixed dose of ginger administration, compared with placebo, on the 24-hour postoperative nausea and vomiting. | Five randomized trials including a total of 363 patients were pooled for analysis of preventing postoperative nausea and vomiting | The design was a systematic review and metaanalysis of trials revealed by searches. Randomized controlled trials comparing ginger with placebo to prevent postoperative nausea and vomiting | This meta-analysis demonstrates that a fixed dose at least 1 g of ginger is more effective than placebo for the prevention of postoperative nausea and vomiting | Use of ginger is an effective means for reducing postoperative nausea and vomiting. | One potential limitation from the nature of our study population is the issue of dosage adjustment in patients with greater body weight, especially those of Western descendants. |
| 2.Levine, M. E., Gillis, M. G., Koch, S. Y., Voss, A. C., Stern, R. M., & Koch, K. L. (2008). Protein and ginger for the treatment of chemotherapy-induced delayed nausea. Journal Of Alternative And Complementary Medicine (New York, N.Y.), 14(5), 545-551. doi:10.1089/acm.2007.0817 | To explore the use of protein meals with ginger for the treatment of the delayed nausea of chemotherapy. | Twenty-eight (28) patients with cancer receiving chemotherapy for the first time were assigned to 1 of 3 groups. | For 3 days beginning the day after their chemotherapy, Control Group patients continued with their normal diet, Protein Group patients consumed a protein drink and ginger twice daily, and High Protein Group patients consumed a protein drink with additional protein and ginger twice daily. | Reports of nausea, frequent nausea, and bothersome nausea were significantly less common among High Protein Group patients than among Control and Protein Group patients. Furthermore, significantly fewer patients in the High Protein Group used antiemetic medication. Differences between the | High protein meals with ginger reduced the delayed nausea of chemotherapy and reduced use of antiemetic medications. Protein with ginger holds the potential of representing a novel, nutritionally based treatment for the delayed nausea of chemotherapy. | The sample of patients was small and widely variable in terms of cancer types, the cytotoxic agents administered, and the antiemetic medications prescribed. There was not an adequate control group for the ginger component of the test meals. In addition, a placebo meal that contained |

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| | | | | Protein and Control groups were not statistically significant. In the 5 patients who had tests of gastric myoelectrical activity per-formed, a significant decrease in gastric dysrhythmia occurred after ingestion of the protein and ginger. | | neither protein nor ginger was not included in the design. |
| 3.Lua, P. L., Salihah, N., & Mazlan, N. (2015). Effects of inhaled ginger aromatherapy on chemotherapy-induced nausea and vomiting and health-related quality of life in women with breast cancer. Complementary Therapies In Medicine, 23396-404. doi:10.1016/j.ctim.2015.03.009 | To assess the efficacy of inhaled ginger aromatherapy on nausea, vomiting and health-related quality of life (HRQoL) in chemotherapy breast cancer patients. | Two oncology clinics in the East Coast of Peninsular Malaysia. Results: Sixty female patients completed the study (age = 47.3 ± 9.26 years; Malay = 98.3%; on highly emetogenic chemotherapy = 86.7%). | Single-blind, controlled, randomized cross-over study. Patients received 5-day aro-matherapy treatment using either ginger essential oil or fragrance-matched artificial placebo (ginger fragrance oil) which was instilled in a necklace in an order dictated by the treatment group sequence. Main outcome measures: VAS nausea score, frequency of vomiting and HRQoL profile (EORTCQLQ-C30 scores). | The VAS nausea score was significantly lower after ginger essential oil inhalation compared to placebo during acute phase (P = 0.040) but not sustained for overall treatment effect | At present time, the evidence derived from this study is not sufficiently convincing that inhaled ginger aromatherapy is an effective complementar y therapy for CINV. The findings for HRQoL were however encouraging with significant improvement in several domains. | the severity of nausea before enrol-ment was not evaluated. patients were blinded, the possibility of a placebo effect cannot be ignored. Because of the distinct odor of ginger essential oil, some of the patients who had experienced using aromatherapy may have recognized the ginger essential oil perfume. |
| 4.Manusirivithaya, S., Sripramote, M., Tangjitgamol, S., Sheanakul, C., Leelahakorn, S., Thavaramara, T., & Tangcharoenpanich, K. (2004). Antiemetic effect of ginger in | To determine whether ginger had antiemetic effect in cisplatin-induced emesis, | 48 gynecologic cancer patients recieving cisplatin-based chemotherapy. | randomized, double-blinded crossover study. Subjects were randomly allocated to regimen A or regimen B in their first cycle of the | Among 43 evaluable patients who received both cycles of treatment, success in controls of nausea and emesis were not significantly | addition of ginger to standard antiemetic regimen has no advantage in reducing nausea or vomiting in | study could not clearly demonstrate difference of nausea and vomiting episodes between ginger and |

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| gynecologic oncology patients receiving cisplatin. International Journal Of Gynecological Cancer: Official Journal Of The International Gynecological Cancer Society, 14(6), 1063-1069. | | | study. All patients received standard antiemetics in the first day of cisplatin administration. In regimen A, capsules of ginger root powder were given orally 1 g /day for 5 days, starting on the first day of chemotherapy. In regimen B, placebo was given on the first day and metoclopramide was given orally thereafter for 4 days. The patients were then crossed over to receive the other antiemetic regimen in their next cycle of chemotherapy. | different between the two regimens in both acute and delayed phases. | acute phase of cisplatin-induced emesis. | metoclopramide in delayed phase of che-motherapy-induced emesis, |
| 5.Panahi, Y., Saadat, A., Sahebkar, A., Hashemian, F., Taghikhani, M., & Abolhasani, E. (2012). Effect of ginger on acute and delayed chemotherapy-induced nausea and vomiting: a pilot, randomized, open-label clinical trial. Integrative Cancer Therapies, 11(3), 204-211. doi:10.1177/1534735411433201 | to evaluate the effects of ginger against both acute and delayed forms of CINV in a population with advanced breast cancer as the main malignancy. | 100 women (mean age = 51.83 ± 9.18 years) with advanced breast cancer who were initially assigned to standard chemotherapy protocol with docetaxel, epirubicin, and cyclophosphamide (the TEC regimen) were randomized to receive ginger (1.5 g/d in 3 divided doses every 8 hours) plus standard antiemetic regimen (granisetron plus dexamethasone ; the ginger | pilot, randomized, open-label clinical trial, | A significantly lower prevalence of nausea was observed in the ginger group during 6 to 24 hours postchemotherapy . Despite this effect, no other significant additional benefit from ginger (1.5 g/d) was observed against prevalence or severity of nausea, vomiting, and retching in any of the assessed periods. | Addition of ginger (1.5 g/d) to standard antiemetic therapy (granisetron plus dexamethasone) in patients with advanced breast cancer effectively reduces the prevalence of nausea 6 to 24 hours postchemotherapy. However, there is no other additional advantage for ginger in reducing prevalence or severity of acute or delayed CINV. | lack of blindness was because of the pilot nature of the study and difficulties in placebo preparation and successful blinding as ginger possesses unique and familiar aroma.40 However, this lack of blindness and patients' awareness of the treat-ment might have caused a so-called reverse placebo effect,41 thereby leading to a more severe evaluation of CINV symp- |

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| | | group) or standard antiemetic regimen alone (control group) | | | | toms and consequent underestimation of ginger efficacy. |
| 6.Pillai, A., Sharma, K., Gupta, Y., & Bakhshi, S. (2011). Anti-emetic effect of ginger powder versus placebo as an add-on therapy in children and young adults receiving high emetogenic chemotherapy. Pediatric Blood & Cancer, 56(2), 234-238. doi:10.1002/pbc.22778 | Chemotherapy-induced nausea and vomiting (CINV) are major adverse effects of chemotherapy. Ginger has been used in postoperative and pregnancy-induced nausea and vomiting. Data on its utility in reducing CINV in children and young adults are lacking. | Cancer center;, control and experiemental group each had 30 people. | double-blind, randomized single institutional study | Acute moderate to severe nausea was observed in 28/30 (93.3%) cycles in control group as compared to 15/27 (55.6%) cycles in experimental group (P¼0.003). Acute moderate to severe vomiting was significantly more in the control group compared to the experimental group [23/30 (76.7%) vs. 9/27 (33.33%) respectively (P¼0.002)]. | Ginger root reduced CINV but did not eliminate it | randomization was done as per cycles rather than subjects |
| 7.Ryan, J. L., Heckler, C. E., Roscoe, J. A., Dakhil, S. R., Kirshner, J., Flynn, P. J., & ... Morrow, G. R. (2012). Ginger (Zingiber officinale) reduces acute chemotherapy-induced nausea: a URCC CCOP study of 576 patients. Supportive Care In Cancer: Official Journal Of The Multinational Association Of Supportive Care In Cancer, 20(7), 1479-1489. doi:10.1007/s00520-011-1236-3 | Despite the widespread use of antiemetics, nausea continues to be reported by over 70% of patients receiving chemotherapy | randomly assigned 744 cancer patients to four arms: 1) placebo, 2) 0.5 g ginger, 3) 1.0 g ginger, or 4) 1.5 g ginger. | Statistical analysis. double blind, multicenter trial, | Ginger supplementation at a daily dose of 0.5 g–1.0 g significantly aids in reduction of the severity of acute chemotherapy-induced nausea in adult cancer patients. | | not controlling for chemotherapy regimens (i.e., high versus low emetogenic regimens) or the severity level of nausea before enrollment |
| 8.Sontakke S, Thawani V, Naik MS Ginger as an anti-emetic in nausea and vomiting induced by chemotherapy: A randomized, cross-over, double blind study. Ind J Pharmacol 2003;35:32–36. | To study the antiemetic effect of ginger root on nausea and vomiting induced by cyclophosphamide. | 50 patients receiving cyclophosphamide in combination with other chemotherapeutic agents. Patients with | A randomized, prospective, cross-over, double-blind study. The patients were randomly assigned to receive one of | Complete control of nausea was achieved in 62% of patients on ginger, 58% with metoclopramide and 86% with ondansetron. Complete control | Powdered ginger root in the dose used was found to be effective in reducing nausea and vomiting induced by | none stated in study |

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| | | atleast two episodes of vomiting in the previous cycle were included. | the three antiemetics: ginger, metoclopramide or ondansetron in the first cycle. They were admitted in the ward for 24 h and observed for the incidence of nausea and vomiting and adverse effects if any, were recorded. Patients were crossed over to receive the other antiemetic treatments during the two successive cycles of chemotherapy. | of vomiting was achieved in 68% of patients on ginger, 64% with metoclopramide and 86% with ondansetron. No adverse effects attributable to ginger were recorded. | low dose cyclophospha mide in combination with drugs causing mild emesis. The antiemetic efficacy of ginger was found to be equal to that of metoclopramid e but ondansetron was found to be superior than the other two. | |
| 9. Zick, S. M., Ruffin, M. T., Lee, J., Normolle, D. P., Siden, R., Alrawi, S., & Brenner, D. E. (2009). Phase II trial of encapsulated ginger as a treatment for chemotherapy-induced nausea and vomiting. Supportive Care In Cancer, 17(5), 563-572. doi:10.1007/s00520-008-0528-8 | However, its efficacy for delayed CINV in a diverse oncology population is unknown. | 162 patients with cancer who were receiving chemotherapy and had experi-enced CINV during at least one previous round of chemotherapy. | a randomized, double-blind, placebo-controlled trial. Participants were randomized to receive either 1.0 g ginger, 2.0 g ginger daily, or matching placebo for 3 days. | There were no differences between groups in the prevalence of delayed nausea or vomiting, prevalence of acute CINV, or severity of delayed vomiting or acute nausea and vomiting. Participants who took both ginger and aprepitant had more severe acute nausea than participants who took only aprepitant. Participants were able to accurately guess which treatment they had received. Ginger appeared well tolerated, with no difference in all adverse events (AEs) and significantly less fatigue and miscella- | Ginger provides no additional benefit for reduction of the prevalence or severity of acute or delayed CINV when given with 5-HT3 receptor antagonists and/or aprepitant. | inadequate power to detect small effect sizes for secondary outcomes. lacked adequate sample sizes to detect differences in the primary and secondary outcomes by treatment with or without aprepitant. participants were able to determine if they were randomized to either of the ginger treatment arms, indicating that how the capsule tasted allowed them to determine which treatment they had received. |

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| | | | | neous AEs in the ginger group. | | |
| 10. Karagozoglu, S., Tekyasar, F., & Yilmaz, F. A. (2012). Effects of music therapy and guided visual imagery on chemotherapy-induced anxiety and nausea-vomiting. *Journal of Clinical Nursing*,*22*(1-2), 39-50. doi:10.1111/jocn.12030 | Effectiveness of music therapy and visual imagery on chemotherapy-induced anxiety and nausea–vomiting | 40 adult cancer patients in the sample group made up control and case groups of study. Data collection used following techniques: the Personal Information Form, Spielberger State-Trait Anxiety Inventory, The Visual Analogue Scale and Individual Evaluation Form for Nausea and Vomiting adapted from The Morrow Assessment of Nausea and Vomiting. | Experimental and cross-sectional study performed on a single sample group consisting of 40 individuals with the pre–post-test design. Level | Music therapy and visual imagery reduced the severity and duration of chemotherapy-induced nausea and vomiting significantly ($p <$ 005). 40% of the patients did not have anticipatory nausea and 55% of the patients did not have anticipatory vomiting during the third chemotherapy cycle during which music therapy and guided visual imagery were implemented. Conclusion: music therapy and visual imagery had positive effects on chemotherapy-induced anxiety, nausea and vomiting, which are suffered often and adversely affect patients' lives. | Music therapy and visual imagery prove to be practical complement approaches that are effective in getting chemotherapy-induced anxiety, nausea and vomiting under control when implemented in clinical setting. Music therapy and visual imagery should be implemented in chemotherapy units, because these methods are effective, easy to use and economic, On-the-job training programs should be held, to increase the interest and sensitivity of professional teams working in oncology units regarding these approaches. | To generalise the research findings for larger populations, studies including larger sample groups should be performed. |
| 11. Hosseini, M., Tirgari, B., Forouzi, M. A., & Jahani, Y. | The objective of this study was to examine the effect of guided imagery on chemotherapy induced | This was a quasi-experimental study in which | Participants completed the Morrow Assessment of | After the intervention, patients at the third session of | Guided imagery, as an inexpensive and | Study limitations included: 1) The participants |

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| (2016). Guided imagery effects on chemotherapy induced nausea and vomiting in Iranian breast cancer patients. *Complementary Therapies in Clinical Practice,25*, 8-12. doi:10.1016/j.ctcp.2016.07.002 | nausea and vomiting in breast cancer patients. | a group of sample was evaluated pre and post intervention. A convenience sample of 55 eligible breast cancer patients patricipated. | Nausea and Vomiting, before and after the intervention. The intervention consisted of listening to the two guided imagery tracks. | chemotherapy had significantly lower mean scores in the frequency and severity of nausea and vomiting pre and post chemotherapy ($p < 0.05$). Guided imagery therapy will considerably improve severity and frequency of chemotherapy induced nausea and vomiting | noninvasive method, is particularly appealing option to alleviate chemotherapy induced nausea and vomiting. It can be used in addition to pharmacological strategies and can be implemented by patients independently with sufficient training. | were selected only from one hospital and may not have been representative of the general population with breast cancer; 2) Small sample size; 3) Use of convenience sample; 4) Brevity of the intervention; and 5) Lack of any follow-up data. Therefore more research on this subject is needed with 1) longer follow-up and 2) larger sample. |
| 12. Zachariae, R., Paulsen, K., Mehlsen, M., Jensen, A. B., Johansson, A., & Maase, H. V. (2007). Anticipatory Nausea: The Role of Individual Differences Related to Sensory Perception and Autonomic Reactivity. *Annals of Behavioral Medicine,33*(1), 69-79. doi:10.1207/s15324796abm3301_8 | The aim is to investigate the possible influence on the development of AN of individual differences in absorption, somato-sensory amplification, and autonomic perception—measures theorized to be related to sensory perception and autonomic reactivity | 125 women (M age = 48.5 years) undergoing adjuvant chemotherapy for breast cancer | Participants rated their expected severity of side effects and completed the Tellegen Absorption Scale, the Somato-Sensory Amplification Scale , and the Autonomic Perception Questionnaire. AN, as well as anticipatory vomiting (AV), distress, and worry/anxiety, were measured prior to the fourth, sixth, and last cycle of chemotherapy. Posttreatment nausea (PN), vomiting, and fatigue were | 34% of the women reported AN before 1 or more cycles. When controlling for treatment characteristics and other known predictors, AN was significantly associated with high absorption in addition to severity of PN, pretreatment worry/anxiety, and not receiving radiotherapy between chemotherapy sessions. AV was not associated with any of the variables investigated. Our data suggest that the association is strongest in the | Absorption and autonomic perception are predictors of anticipatory side effects in cancer patients receiving chemotherapy. Individuals high in absorption may be more autonomically reactive | Focuses on sensory perception, not necessarily being from guided imagery itself. Although this sensory perception and autonomic reactivity can come from guided imagery/music therapy. |

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| | | | measured after the first, fourth, sixth, and last cycle. | early phases of treatment. | | |
| 13. Marchioro, G., Azzarello, G., Viviani, F., Barbato, F., Pavanetto, M., Rosetti, F., . . . Vinante, O. (2000). Hypnosis in the Treatment of Anticipatory Nausea and Vomiting in Patients Receiving Cancer Chemotherapy. *Oncology*,*59*(2), 100-104. doi:10.1159/000012144 | The aim is to shortly review the etiological, epidemiological and therapeutical assumptions on the topic, in particular the psychological-behavioral therapies of relieving nausea and vomiting related to chemotherapy. | The present study was carried out on 16 consecutive adult cancer patients affected by chemotherapy-induced anticipatory nausea and vomiting who had received at least four treatment cycles. All of them were submitted to induction of relaxation followed by hypnosis. | The 1-hour hypnosis program was then induced as follows: (a) preliminary relaxation state induction according to Vogt; (b) fixation of a point with suggestion induction of eye weariness and eyelid heaviness; (c) suggestions aiming to create monoideistic conditions as a consequence of verbal, auditive, and kinesthetic meanings, able to induce sensorial alterations up to organ anesthesia. Anti-emetic efficacy was defined as complete response (mild nausea with no vomiting), major response (moderate to severe nausea and one vomiting episode) or no response (none of above). | In all subjects anticipatory nausea and vomiting disappeared, and major responses to chemotherapy-induced emesis control were recorded in almost all patients. | The experience highlights the potential value of hypnosis in the management of anticipatory nausea and vomiting; furthermore, the susceptibility to anticipatory nausea and vomiting is discussed under the psychoanalytic point of view. | Limitations include: mall sample size and subjectiveness of data collection. |
| 14. Gimeno, M. M. (2010). The Effect of Music and Imagery to Induce Relaxation and Reduce Nausea and | The purpose of this study was to investigate the effects of music and imagery versus imagery-only interventions on inducing relaxation and reducing nausea and emesis in patients with | Twenty adult patients with cancer receiving chemotherapy treatment participated in this study (16 | Regression analysis was used to examine factors relating to the frequency of nausea and emesis as well as heart rate. | Results indicated a statistically significant decrease on posttreatment heart rate for MI and IO interventions. | Music and imagery therapies were successfully able to induce relaxation amongst patients and | Some of the limitations of this study were the small sample size and the many variables involved. It would also have |

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| Emesis in Patients With Cancer Undergoing Chemotherapy Treatment. *Music and Medicine,2*(3), 174-181. doi:10.1177/1943862110374622 | cancer undergoing chemotherapy treatment. | female and 4 male). Three dependent measures (heart rate, nausea, and emesis) were collected both before and after each of six intervention sessions.Experimental treatment conditions were guided imagery with music (MI) or without music (IO), alternated across the sessions. As part of the experimental treatment, participants were also encouraged to listen to music at home, that is, to listen twice daily to CD recordings for relaxation. | | There was a significant decrease in the frequency of nausea and emesis over time, that is, across the 6 weeks of treatment. Self-reports from the participants indicated that the guided imagery with music, both in the experimental intervention sessions and at home, seemed to be very beneficial in inducing relaxation for these particular cancer patients. | showed a decrease in nausea and emesis amongst these patients. | been desirable to include a music-only condition to this repeated measures study, as well as a control condition in which neither music, imagery, nor imagery with music was included. Another limitation of this study was the method by which the data were collected. |
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| 16.Melchart, D., Ihbe-Heffinger, A., Leps, B., Schilling, C. V., & Linde, K. (2006). Acupuncture and acupressure for the prevention of chemotherapy-induced nausea—a randomised cross-over pilot study. Supportive Care in Cancer, 14(8), 878-882. doi:10.1007/s00520-006-0028-7 | To investigate whether a combination of acupuncture and acupressure is effective for reducing chemotherapy-induced nausea and vomiting | 28 patients receiving moderately or highly emetogenic chemotherapy and conventional standard antiemesis were treated for one chemotherapy cycle with a combination of acupuncture and | Double blind randomised cross-over trial, | Seventeen of 21 participants completing the study would desire acupuncture and acupressure for future chemotherapy cycles, but there was no clear preference for treatment at one of the alternative points | Based on the small sample size and the inconsistency with the findings, more research is justified to establish if acupressure and/or acupuncture are effective at reducing nausea and vomiting in chemotherapy | Small sample size of 28 participants starting at the beginning of the study an d ending with 17 participants |

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| | | acupressure at point P6 and for one cycle at a close sham point | | | patients | |
| 17.Suh, E. E. (2011). The Effects of P6 Acupressure and Nurse-Provided Counseling on Chemotherapy-Induced Nausea and Vomiting in Patients With Breast Cancer. Oncology Nursing Forum, 39(1). doi:10.1188/12.onf.e1-e9 | To evaluate the effects of pericardium 6 (P6) acupressure and nurse-provided counseling on chemotherapy-induced nausea and vomiting (CINV) in patients with breast cancer. | 120 women who were beginning their second cycle of adjuvant chemotherapy after definitive surgery for breast cancer and who had more than mild levels of nausea and vomiting with the first cycle of chemotherapy. Participants were assigned randomly into four groups: control (placebo on SI3), counseling only, P6 acupressure only, and P6 acupressure plus nurse-provided counseling. The experiences of upper-gastrointestinal distress were measured by the Rhodes Index of Nausea, Vomiting, and Retching for acute (day 1) and delayed (day 2 to day 5) CINV | Randomized, controlled trial. | The effects of acupressure were proven from day 2 to day 5, and the effects of nurse-provided counseling were proven on day 4 and were close to significance level on day 5. Synergic effects of P6 acupressure with nurseprovided counseling appeared to be effective in reducing CINV in patients with breast cancer. | P6 acupressure combined with counseling by nurses is a safe and easy-to-apply tool in CINV management in practice. | Relatively small sample size of each treatment group. Collecting data from only women in one cancer center also limits the generalizability of the study findings |
| 18.Dibble, S., Luce, J., | To compare differences | Ten community | A multicenter, | Acupressure at | Acupressure is | A population |

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| Cooper, B., Israel, J., Cohen, M., Nussey, B., & Rugo, H. (2007). Acupressure for Chemotherapy-Induced Nausea and Vomiting: A Randomized Clinical Trial. Oncology Nursing Forum, 34(4), 1-8. doi:10.1188/07.onf.xxx-xxx | in chemotherapy-induced nausea and vomiting (CINV) among three groups of women (acupressure, placebo acupressure, and usual care) undergoing chemotherapy for breast cancer. | clinical oncology programs associated with the University of Texas M.D. Anderson Cancer Center and nine independent sites located throughout the United States. Sample: 160 women who were beginning their second or third cycle of chemotherapy for breast cancer treatment and had moderate nausea intensity scores with their previous cycles. Subjects were randomized to one of three groups: acupressure to P6 point (active), acupressure to SI3 point (placebo), or usual care only. Subjects in the acupressure group were taught to apply an acupressure wrist device by research assistants who were unaware of the active acupressure point. All subjects | longitudinal, randomized clinical trial throughout one cycle of chemotherapy. | the P6 point is a value-added technique in addition to pharmaceutical management for women undergoing treatment for breast cancer to reduce the amount and intensity of delayed CINV | a safe and effective tool for managing delayed CINV and should be offered to women undergoing chemotherapy for breast cancer.<br>Key | that consisted of only women. Some women broke the “blind study” by figuring out which pressure point was the placebo and which point was the point of study. There were variations of “dosage” of acupressure due to inability to accurately find the pressure point every time as well as long finger nails hindering the pressure given. |

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| | | completed a daily log for 21 days containing measures of nausea and vomiting and recording methods (including antiemetics and acupressure) used to control these symptoms | | | | |
| 19.Molassiotis, A., Helin, A., Dabbour, R., & Hummerston, S. (2007). The effects of P6 acupressure in the prophylaxis of chemotherapy-related nausea and vomiting in breast cancer patients. Complementary Therapies in Medicine, 15(1), 3-12. doi:10.1016/j.ctim.2006.07.005 | Evaluate the effectiveness of using acupressure in Pericardium 6 acu-point in managing chemotherapy-induced nausea and vomiting | 54 paitients were recruited and randomized, but only 36 subjects completed the study. Subjects were recruited from two different cancer centers. Acupressure was applied using wristbands with patients in the experimental group had to wear for 5 days following the chemotherapy administration. Assssment of nausea, retching and vomiting were obtained from all patients daily for 5 days. 36 patients completed. 19 in the control arm and 17 in the experimental arm. | Randomized control trial | Nausea and retching experience, and nausea, vomiting, and retching occurance and distress were all significantly lower in the experimental group compared to the control group. | Acupressure is safe and convienient non-pharmacological complementary therapy in the management of the complex symptoms of chemotherapy-induced nausea and vomiting. | Small sample size of 36 subjects and well as an all-female population. |

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| 20. Roscoe, J. A., Morrow, G. R., Hickok, J. T., Bushunow, P., Pierce, H. I., Flynn, P. J., . . . Atkins, J. N. (2003). The Efficacy of Acupressure and Acustimulatoin Wrist bands for the Relief of Chemotherapy-Induced Nausea and Vomiting: A University of Rochester Cancer Center Community Clinical Oncology Program Multicenter Study. Journal of Pain and Symptom Management, 26(2), 731-742. doi:10.1016/S0885-3924(03)00254-9 | Primary objective was to examine the efficacy of acupressure and acustimulation bands as adjuncts to standard 5-HT3 antiemetics in reducing acute ausea and delayed nausea associated with highly emetogenic chemotherapy. | 739 patients were randomly assigned to either acupressure bands, acustimulation bands, or no band control condition. Type and amount of antiemetic medication taken during days 2-5 were not regulated ut were recorded in the patient diary. Those assigned to weraring bands were given the bands prior to treatment and shown how to wear them and were given specific instructions. | Randomized control trial | Patients in the acupressure condition experienced less nausea on the day of treatment compared to controls. There were no significant differences in delayed nausea or vomiting among the three treatments conditions. Men experienced more nausea control in the acustimulation group but not in the acupressure group. | More research is needed to be done to assess if there is a gender gap between efficacy of acustimulation and acupressure in the male and female populations. | No placebo arm due to resources. It would have made it a 5-arm trial instead of a 3-arm trial. |
| 21. Molassiotis A, Russell W, Hughes J, Breckons M, Lloyd-Williams M, Richardson J, et al. The effectiveness and cost-effectiveness of acupressure for the control and management of chemotherapy-related acute and delayed nausea: Assessment of Nausea in Chemotherapy Research (ANCHoR), a randomised controlled trial. Health Technol Assess 2013;17(26). | assess the effectiveness and cost-effectiveness of self acupressure using wristbands compared with sham acupressure wristbands and standard care alone in the management of chemotherapy-induced nausea | 500 patients were randomised in the study arms. The three arms consisted of usual care plus (1) self-administered acupressure wristbands, (2) sham acupressure wristbands and (3) no additional treatment. The duration of the patients' involvement was for four cycles of chemotherapy, as after four cycles patients not responding | randomised controlled trial with three arms | The primary outcome analysis (nausea in cycle 1) revealed no statistically significant differences between the three groups, although nausea level in the patients using wristbands (both real and sham) was somewhat lower than that in the antiemetics only group. A gender interaction effect was evident in the data. No significant differences were detected in relation to vomiting outcomes, anxiety | The use of wristbands was safe and perceived to be effective by patients. Before rejecting this intervention we need to consider the therapeutic effect of placebos in situations such as the management of nausea, when low-cost and safe interventions may enhance the effect of antiemetic drugs even in the absence of | none stated |

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| | | to the given chemotherapy may discontinue it, may be offered a different chemotherapy regimen or a different treatment plan, or may be offered supportive care only. | | and quality of life | clearly statistically significant effects. | |